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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/533,169 | 04/17/2006 | Takeaki Saiki | 71051-008 | 9218 |
| 27305 7590 12/02/2010 HOWARD & HOWARD ATTORNEYS PLLC 450 West Fourth Street Royal Oak, MI 48067 | | | | |
| EXAMINER | | | | |
| DOLLINGER, MICHAEL M | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 1766 | | | | |
| MAIL DATE | | DELIVERY MODE | | |
| 12/02/2010 | | PAPER | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/533,169

Applicant(s)

SAIKI ET AL.

Examiner

MIKE DOLLINGER

Art Unit

1766

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SG/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

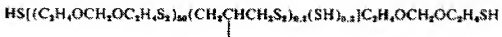
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ely (US 3,925,331).
2. Ely discloses a moisture curable sealant composition which comprises the product of reacting under anhydrous conditions a polysulfide of the formula



with a silane of the formula $\text{Q}_n\text{SiX}_{4-n}$ where n is 1 or 2, Q is an organic groups which may be $\text{CH}_2=\text{CR}_{15}-\text{C}_m\text{H}_{2m}-$, and at least 2 X are organic hydrolyzable groups and the remaining X (if any) is C_{1-6} alkyl or chloroalkyl [abstract]. When the Q group in the silane is of formula $\text{CH}_2=\text{CH}(\text{CH}_2)_m$ e.g. as in vinyl triethoxysilane or vinyl ethyldimethoxy (or diethoxy) silane, 3-10% of the SH groups of polysulphides of molecular weight 4,000-10,000 can be reacted by heating for 8-25 hr at 80-120°C with an amount of silane in the molar ratio to thiol in the polysulphide of 0.5 : 1 to 1.5 : 1. Addition of 0.001-3% by weight of catalyst e.g. an amine such as pyridine or sulphur enhances the amount of addition under otherwise identical conditions [column 6 lines 4-13]. In Example 14, for instance, Ely discloses a process wherein (B) 0.05mol of a polymer of the formula



was mixed with 500ml toluene and the mixture was boiled under reflux to remove water [column 17 lines 35-42] to achieve an inert environment and to this solution was added (D) 2.5g of sulfur (0.078mol) and (A) 0.17mol of vinylmethyldimethoxysilane [column 17 lines 42-45]. If pyridine was added as a catalyst as well, it would be included in an amount of 0.001-3% by weight of the composition which corresponds to 0.05 to 15.8 g or pyridine equal to 0.00067 to 0.2mol pyridine. Pyridine reads on a monoarylamine.

3. Ely does not disclose a process wherein both a nitrogen containing base and sulfur are mixed with claimed components (A) and (B). However, Ely does disclose that both pyridine (a nitrogen containing organic base) and sulfur may be used as catalysts for the reaction of (A) and (B) [column 6 lines 12-13].

4. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have prepared a silicon containing polysulfide type polymer by the process of mixing a vinyl silane, mercapto terminated polysulfide, nitrogen containing organic base and elemental sulfur because Ely teaches that it is within the skill of the art to prepare a silicon containing polysulfide type polymer by the process of mixing a vinyl silane, mercapto terminated polysulfide and Ely also teaches that it is within the skill of the art to catalyze the reaction with pyridine or elemental sulfur. One would have found it obvious to use both elemental sulfur and pyridine as the catalyst because Ely teaches that they are functional equivalents for this purpose and it is *prima facie* obvious to combine two composition each of which is taught by the prior art to be

useful for the same purpose, in order to form a third composition to be used for the very same purpose. See *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA). Absent any evidence to the contrary, there would have been a reasonable expectation of success in mixing a vinyl silane, mercapto terminated polysulfide, nitrogen containing organic base and elemental sulfur.

5. Regarding claim 9, Examiner has calculated the claimed mole percents of Example 14 of Ely that are required by claim 9 and found that (B) is used in an amount of 29.4 mol% of (A), (C) is used in an amount of 0.4 to 117 mol % of (A), and (D) is used in an amount of 3.1 mol % of (S_yR^3) repeating units in (B). The disclosed range of mol% of (C) overlaps the claimed range of 0.01 to 10 mol%. In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior *a prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 1911 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

6. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Price et al (US 4,096,131) in view of Ely (US 3,925,331).

7. In Example 9, Price et al disclose a process of forming a silyl containing polysulfide polymer by mixing (B) a polysulfide of the formula [column 13 line 1]



with (D) 25 g of sulphur and (A) 150 g of methylvinyl dimethoxysilane under an atmosphere of nitrogen and vacuum at 100°C [column 15 lines 39-45].

8. Price et al do not disclose a process wherein a nitrogen containing organic base is mixed with components (A), (B) and (D).

9. Ely, discussed above, discloses that both pyridine (a nitrogen containing organic base) and sulfur may be used as catalysts for the reaction of (A) and (B) [column 6 lines 12-13]. Ely teaches, henceforth, that pyridine and sulfur are functionally equivalent for the purpose of catalyzing the reaction of (A) and (B). Ely also teaches that pyridine and sulfur should be included in 0.001 to 3% by weight [column 6 lines 12-13]. Pyridine reads on a monoarylamine.

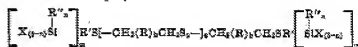
10. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have prepared a silicon containing polysulfide type polymer by the process of mixing a vinyl silane, mercapto terminated polysulfide, nitrogen containing organic base and elemental sulfur because Price et al teach that it is within the skill of the art to prepare a silicon containing polysulfide type polymer by the process of mixing a vinyl silane, mercapto terminated polysulfide and sulfur and Ely teaches that it is within the skill of the art to catalyze the reaction of a vinyl silane and a mercapto terminated polysulfide polymer with pyridine or elemental sulfur. One would have been motivated to use both elemental sulfur and pyridine as the catalyst in the process of Price et al because Ely teaches that they are functional equivalents for this purpose and it is *prima facie* obvious to combine two composition each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for

the very same purpose. See *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA). Absent any evidence to the contrary, there would have been a reasonable expectation of success in mixing a vinyl silane, mercapto terminated polysulfide, nitrogen containing organic base and elemental sulfur.

11. Regarding claim 9, Examiner has calculated the claimed mole percents of Example 9 of Price et al that are required by claim 9 and found that (B) is used in an amount of 110 mol% of (A), (C) is used in an amount of 0.06 to 190 mol % of (A) (calculated based on the weight range of pyridine disclosed in Ely, discussed in paragraph 22), and (D) is used in an amount of 2.7 mol % of (S_yR³) repeating units in (B). The disclosed range of mol% of (C) overlaps the claimed range of 0.01 to 10 mol%. In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 1911 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

12. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Plueddemann (US 3,317,461) in view of Ely (US 3,925,331).

13. Plueddemann discloses a composition consisting essentially of a polymer of the formula



wherein R is free of aliphatic unsaturation, and is made up of 50 divalent radicals made up of C, H, and optionally O and S atoms, the latter being in the form of C-O-C, OH, -SH and C-S-C groups, *a* is an integer with a value of 2 through 4, R' is a multivalent radical that can be composed entirely of C and H, R'' is a monovalent hydrocarbon group, X is a hydrolyzable group preferably alkoxy, *n* is an integer of 0 to 2 and *m* is an integer equal to one less than the valence of R' and *c* is preferably a number from 5 through 100 [col 2 lines 3-4]. Plueddemann discloses the method for preparing the inventive composition including reacting polysulfide polymers of the formula



with a silane containing a substituent having the C=C group in the presence of peroxides or an alkaline catalyst such as alkali metal alkoxides [col 2 lines 24-42].

14. Ely discussed above, discloses the claimed method of preparing silylated polysulfide polymers wherein a SH containing polysulfide is reacted with a vinyl silane in the presence of pyridine and/or sulphur. Ely also discloses that an acrylic or methacrylic acid ester silanes may be reacted with the SH containing silanes in the presence of sodium [col 6 lines 15-22]. So Ely teaches that the claimed process and the process of Plueddemann are functionally equivalent for the purpose of preparing a silylated polysulfide polymer from an unsaturated organosilane and an SH containing polysulfide. Ely also teaches that the claimed process of mixing the silane and SH containing polysulfide in the presence of pyridine and/or sulphur is superior to the alkali metal alkoxide catalyzed reaction of Plueddemann when the organosilane is a vinyl

containing silane (R' of Plueddemann is a hydrocarbon) rather than an acrylate containing silane.

15. It would have been obvious to one having ordinary skill in the art the time the invention was made to have prepared a disilane polysulfide polymer by the process of mixing an SH containing polysulfide, an unsaturated organosilane, an organic base or ammonia and sulfur because Plueddemann teaches that it is within the skill of the art to prepare a disilylated polysulfide polymer by the process of mixing an SH containing polysulfide, an unsaturated organosilane and an alkali metal hydroxide and Ely teaches that it is within the skill of the art to prepare a silylated polysulfide by the process of mixing an SH containing polysulfide, an unsaturated organosilane in the presence of either 1) pyridine and sulfur or 2) sodium methoxide. One would have been motivated to use the first method of Ely to prepare the disilylated polysulfides of Plueddemann because Ely teaches that it is functionally equivalent to the method of Plueddemann and it is *prima facie* obvious to substitute art-recognized functional equivalents known for the same purpose, see MPEP § 2144.06 and Ely also teaches that the first method is preferably for vinyl containing silanes. One would have found it obvious to use both elemental sulfur and pyridine as the catalyst because Ely teaches that they are functional equivalents for this purpose and it is *prima facie* obvious to combine two composition each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose. See *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA). Absent any evidence to the contrary, there would have been a reasonable expectation of success in mixing a

vinyl silane, mercapto terminated polysulfide, nitrogen containing organic base and elemental sulfur.

16. Regarding claim 9, Examiner has calculated the claimed mole percents of Example 14 of Ely that are required by claim 9 and found that (B) is used in an amount of 29.4 mol% of (A), (C) is used in an amount of 0.4 to 117 mol % of (A), and (D) is used in an amount of 3.1 mol % of (S_yR^3) repeating units in (B). The disclosed range of mol% of (C) overlaps the claimed range of 0.01 to 10 mol%. In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior *a prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 1911 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

Response to Arguments

17. Applicant's arguments filed 09/24/2010 have been fully considered but they are not persuasive.

18. Applicants argue that both the Ely and Price references do not disclose the claimed invention because they disclose mercapto functional polysulfide polymers that are only partially reacted with silane groups. Applicants argue that at least 70% of the mercapto terminals in the polysulfide polymers remain unreacted with the silane compounds. Applicants argue that this means the disilane functional polysulfide of the claims is not disclosed. This argument is not convincing. While Applicants' interpretation of the prior art is not incorrect, the disclosed processes of Ely and Price

still read on the claims. The claims are directed to a method for the preparation of a reaction product *consisting essentially of* disilane functional polysulfide, not to a composition *consisting of* the claimed disilane polysulfide. Any disclosed method that reads all the method steps and prepares some of the polymers of the claims, reads on the entire claim. The methods of Ely and Price in view of Ely disclose each of the reaction steps of the claims and produce a reaction product that will include a substantial portion of the disilane functional polysulfide of the claims. The terminal mercapto groups on the polysulfides of Ely and Price will react with the silane compounds at random. At least some of the polysulfide polymers will react with a silane compounds at each terminal end, resulting in the polymers of the claims. "Consisting essentially of" excludes any components from the scope of the claim that adversely affect the basic and novel characteristics of the claimed invention. Applicants have presented no arguments asserting that the monosilane polysulfide and the unfunctionalized polysulfide damage the invention. Nor has Applicant amended the claims to limit the scope to a process preparing a reaction product excluding other polysulfide polymers.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

While the previous rejections were maintained because the amendment failed to fully obviate them, the new rejection over Plueddemann in view of Ely is additionally presented because the amendments changed the scope of the claims to make Plueddemann in view of Ely the closest prior art. This rejection is presented now so that if the case is appealed the closest prior art can be discussed. Additionally, this rejection was not necessary in the first office based on the scope of the claims. Hence, it is the Office's position that the present case is properly made final for these reasons.

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MIKE DOLLINGER whose telephone number is (571)270-5464. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/mmd/

/RANDY GULAKOWSKI/
Supervisory Patent Examiner, Art Unit 1766